

**PMIC Supports Thermal Energy Harvesting With Low-Voltage Startup**

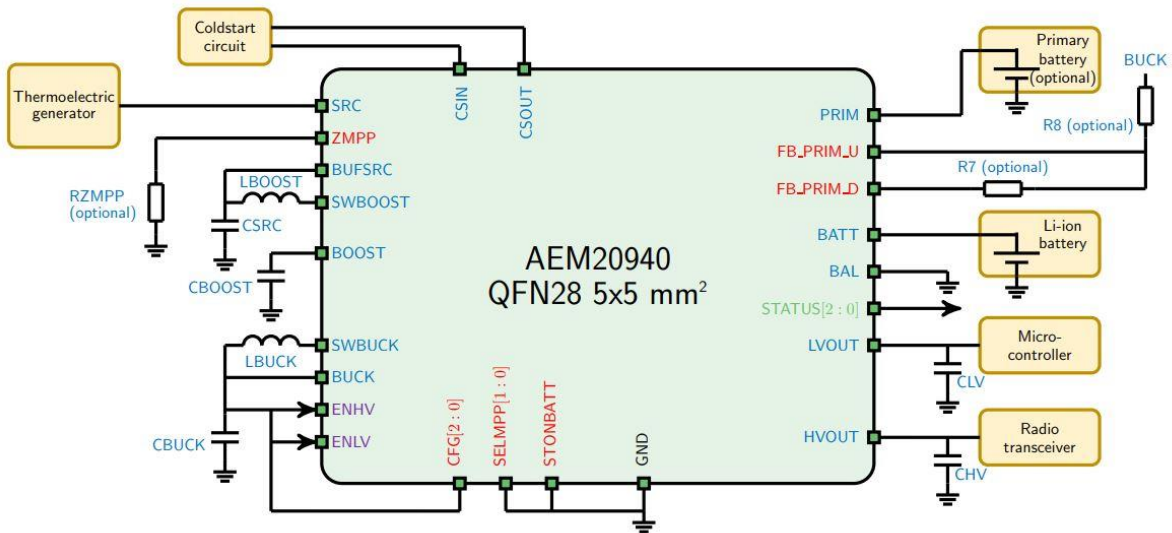
[e-peas'](#) AEM20940 power management IC (PMIC) is specifically optimized for energy harvesting from thermal sources in wireless sensor applications. Supplied in a space-saving 28-pin QFN, this chip is based on proprietary technology capable of extracting available input current up to 110 mA. Taking dc power from a connected thermal electric generator (TEG), it can supervise the storing of energy in a rechargeable element and simultaneously supply energy to the system via two different regulated voltages (Fig. 1.)

This is done through its built-in low noise, high stability 1.2-V/1.8-V and 2.5-V/3.3-V LDO voltage regulators (Fig. 2). The lower voltage can be employed for driving a system microcontroller, while the higher voltage is intended for an RF transceiver.

Through the AEM20940's deployment, it will be possible to extend the system battery life or, in many cases, eliminate the primary power source from the system completely. By this any dependence on having to regularly replace batteries can be removed.

A key characteristic of the device is its ultra-low power start-up characteristics. It can achieve a cold start (with no stored energy available) from just a 100-mV input voltage and 80-μW input power with an external module. Sophisticated energy management functions enable fast supercapacitor charging and warn when stored energy reserves are running low.

The main target applications envisaged for the AEM20940 are in industrial process monitoring, HVAC and predictive maintenance. For more information on this device, see the [product brief](#) .



*Fig. 1. The AEM20940 is an integrated energy management subsystem that extracts dc power from a thermal electric generator to simultaneously store energy in a rechargeable element and supply the system with two independent regulated voltages. It integrates an ultra-low power boost converter to charge a storage element, such as a Li-ion battery, a thin film battery, a supercapacitor or a conventional capacitor.*

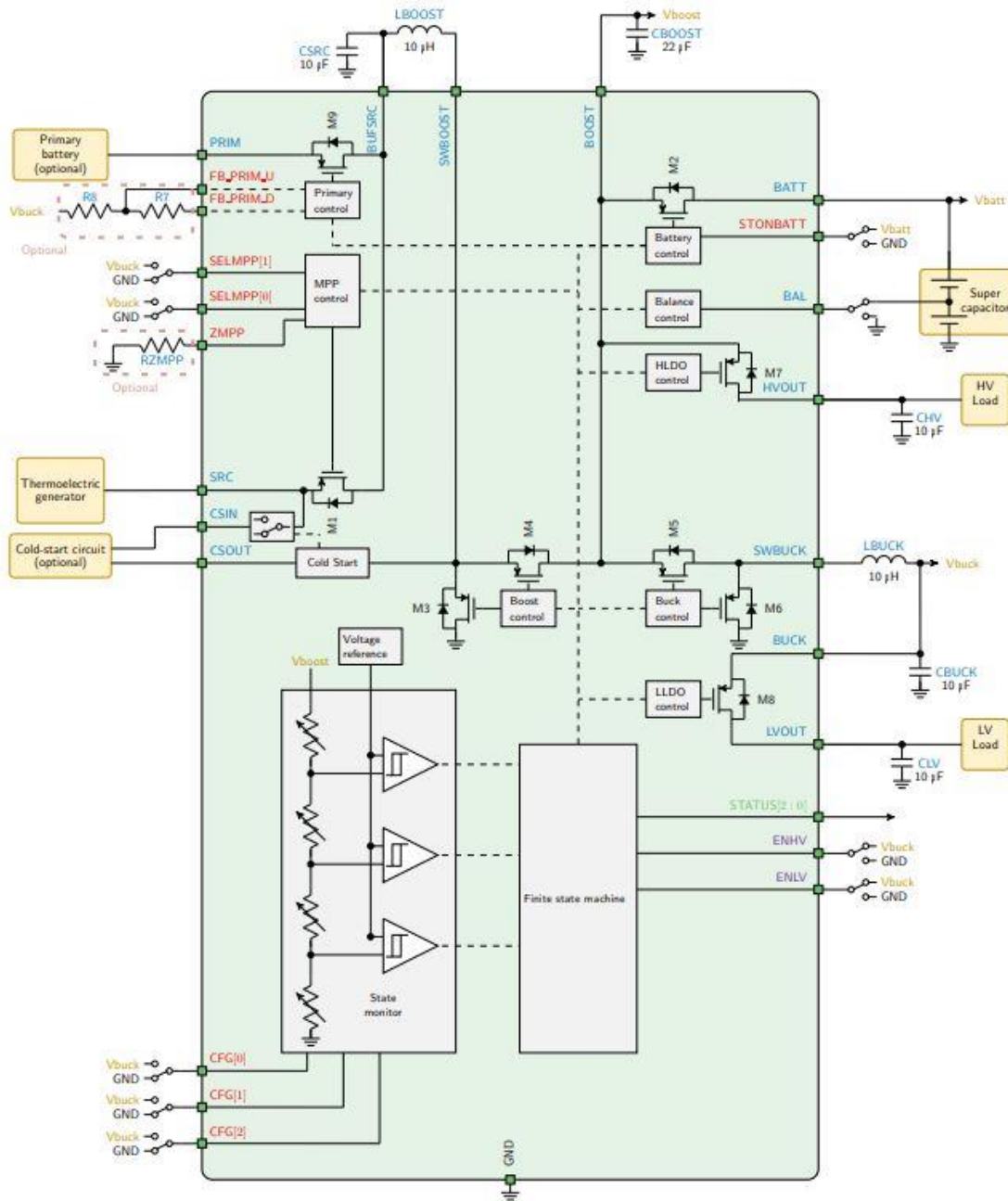


Fig. 2. The power management IC's cold start circuit enables start up (with no stored energy available) from an input voltage as low as 100 mV and just 80  $\mu$ W of input power typ. Meanwhile, the on-chip boost converter enables operation from an input range of 50 mV to 5 V. Integrated LDOs are intended to power a system microcontroller and an RF transceiver.